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ABSTRACT

Rather than replace the modal methodology approach to writing with an aim or purpose-oriented pedagogy and criticism, it would be profitable for writing across the curriculum teachers to recycle the modes, using them as topics of generative and analytic invention. The move from mode to topic can be applied to the texts of contemporary science essayists, such as Loren Eiseley. There appear to be two rhetorical motives for Eiseley's reliance on the narratizing of science. First, Eiseley's complete dedication to the paleontologist's and anthropologist's inductive and deductive methods seems to be fraught with a writer's need to communicate, to transform the data and hypotheses gathered from his observations into ideas that the intelligent layperson might comprehend. The second motive locates itself in the space between Eiseley's fictionalized audience and the inductive/deductive methods he uses to observe, record, and interpret nature. Two needs are filled by these motives. His audiences are able to see wholes in parts, to relate fact and overall picture and arrive at new and more holistic senses of chronology, of species, and environment. The narrative impulse to know and express science in a more complete and more human way means to know and write as a scientist following a careful methodology, and, in storytelling, to make what has been learned understandable and significant to others. (Five notes are included, and 18 references are appended.) (MS)

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The Narrative Topic and The Contemporary Science Essay: A Lesson from Loren Eiseley's Notebooks

Modern composition teaching and theory has recently spent a great deal of time criticizing the modal approach to writing. Modalism, critics such as James Kinneavy, James Berlin, Robert Connors, and James Britton argue, was the product of nineteenth-century moves toward efficiency in composition teaching, a reaction against the fuller treatments of oral and written discourse in the classical tradition.[1] These critics have most often argued that the modes be replaced by an emphasis on audience and purpose, by a contextual rhetoric that refuses to reduce writing to a universal set of rules, prescriptions, or skills, and by a fuller, more organic treatment of the process of composing. I wish here to carry this shift in emphasis a step further. Rather than, as Kinneavy has argued, replace the modal methodolgy with an aim or purpose-oriented pedagogy and criticism, I believe it would also be profitable at this point to re-cycle the modes, using them as topics of generative and analytic invention. To suggest the advantage of this shift, I will first define a group of texts to which the move from mode to topic might profitably be applied.

Many contemporary science essayists (Stephen Jay Gould, Oliver Sacks, Lewis Thomas, among others) have based their art on a marriage of story and exposition.[2] Some attention has recently been given to the complex ways in which expository and narrative forms interact in these science essays.[3] This formal interaction affects readers in complex ways, turning the scientist's reliance on a disciplinary or professional body of

knowledge, vocabulary, and methodology into the stuff of story and myth. Stephen Jay Gould and Loren Eiseley, the subject of this essay, make the scientific history of evolution into an adventure story parallel in emotional impact and literary imagination to the Genesis story in the Bible. Writers like Gould and Eiseley are, in effect, re-making our collective psychology, are providing an emotional base for the sober deductive and inductive findings of everyday, ordinary science.

But I wish to switch my emphasis in this essay to another line of inquiry. Perhaps Gould and Eiseley's combinations of forms are simply the surface representation of deeper, and equally new, ways of thinking. For these science essaysists, story has become a way of knowing and inventing material, a place to find content and structure. It is as if we must imagine Loren Eiseley hard at work on a field trip, bone-collecting on the prairie or Dakota badlands, then later sitting down to write about his finds and observations. Certainly as a professional scientist (he taught at the Universities of Kansas and Pennsylvania) Eiseley had to do the ordinary work of science: the careful notebook entries, the field logs, the reports and professional articles, even the grant requests.

But Eiseley had, as he wrote, another impulse, an impulse to make a story of what he found, to fit the particulars located in his fossils and observations of nature into a larger, narrative picture of natural evolution, of life and this planet always in a state of becoming. He, in other words, first went to narratives and story not as a form to contain his content, but as a place, a topic, through which his findings might be renewed and given larger signficance. The ordinary scientist's commitment to fact and

observation never flagged; his desire to be a professional in methodology and knowledge never decreased. But his ten books of popular prose and four books of poetry attest to the fact that this narrative impulse gradually subsumed all that he did.[4] In the story topic, Eiseley connected with his readers' need to, to use Robert Frost's phrase, become "whole again, beyond confusion."

II.

Eiseley's reliance on the narratizing of science demands that we look first at his motives for devoting so much of his writing space to this topic. I propose two rhetorical motives as psychological influences on Eiseley the literary scientist.

First, Eiseley's complete dedication to the paleontologist's and anthropologist's inductive and deductive methods seems always to be fraught with a writer's need to communicate, to transform the data and hypotheses gathered from his observations (gleaned from field trips or laboratory experiments) into ideas that the intelligent layperson might comprehend. And for Eiseley comprehension means a specific thing: enabling these general readers to make connections between specific scientific phenomena and more general ideas about the origin and development of nature and the story of the human species. Eiseley had developed the data for this kind of essay writing during his earlier explorations of Western, plains terrain, and from his analyses of professional and public reaction to specific cultural events--the Piltdown Man hoax, the big-bang theory, and other popular controversies.[5] Listen to these citations from Eiseley's recently-published Lost Notebooks:

Sept. 1, 1955

It occurs to me that there is a very clear analogy between the way in

> which an apartment house (or another building for that matter) acquires its biota and the way an oceanic island acquires its plant and animal population. An apartment house newly built (a recent volcanic island upthrust from the waves) is destitute at first of a fauna. If it is remote from neighborhoods where such a fauna may be acquired (islands far at sea), it may be destitute of insects, silverfish, etc., for a longer period. As times runs on, however, the change of immigrants arriving intensifies. A pair of roaches may arrive in a box (floating timber), and soon the house is populated so extensively that even professional exterminators can only keep the population reduced. [How close] the apartment house may lie to other, older ones or to neighborhood groceries, as in say, New York, will play a part in the time involved before population is acquired. Now, to give this a figurative evolutionary twist, we might imagine each house more self-contained than it actually is and lasting over more than one geological period. Let us say that in one house roaches have grown adjusted to a given poison, in another they have developed clever adaptations for evading the traps set for them by people, or perhaps other insects have been introduced to combat them. Say spiders (Eiseley, Natural History, 1955).

* * * * *

May, 1956

> Four hundred million years have passed since the vertebrates fought on the sea floor. They were the last of the great animal phyla (groups) to appear, and if any creature below the tides knows the place of their origin, it is the starfish. Or it may be that that dark, magnificent-lensed octopod eye remembers us. He is older than we and has changed less. He was there when we squirmed in the mud, when our mouths were jawless, when our spine was a rubbery rod and we were lucky to know light from darkness. He was there when a fish was something very close to a worm--and when to say that about a fish was the same thing as saying it about a man, because they were all contained in a mysterious creature with gill slits and a nerve cord on its back instead of its front. The nerve cord is still there, only swollen at one end. With it you interpret these lines(Eiseley, Natural History, 1956).

In both these passages, we find Eiseley's narrative capturing the general significance of what was a long series of empirical and theoretical research. Passage one develops an analogy between apartment house and island, one achieving its biological population in ways similar to the other despite their very different structures and locales. Rather than review the facts of these population-building processes in exposition, Eiseley chooses to give us

a temporally-arranged, simply-styled story in which we, as readers, are asked to re-imagine these processes over time. As always with Eiseley, the real protagonists in this story of natural processes are change and adaptation. To help us, as readers, experience the influences of both these processes, rather than simply be told about them, Eiseley employs chronological/temporal narrative, from a reflective, first-person point of view, to tell his discipline's story.

Eiseley's second rhetorical motive for using the narrative topic surfaces in our second passage from The Lost Notebooks. Again, this motive locates itself in the space between Eiseley's fictionalized audience (the intelligent layman in search of larger truths than either science or literature alone can provide) and the inductive/deductive methods he uses to observe, record, and interpret nature. The starfish with its "dark, magnificient-lensed octopod eye" becomes the protagonist in Eiseley's little story of creation. The purpose of this story (first written in 1956) was to give Eiseley's readers a sense of what evolution and natural selection really meant. They were not processes that could be simplified into searches for and arguments about proposed "missing links" or about whether or not man was descendent from an ape. These were the uses to which both popularizers and argumentative professionals were putting them in the 1950's. Rather, they were processes that ought to lead man to immense respect for nature's capabilities for change, adaptation, and development, over and through time and space. Men and women were not simply descendents of other species or forms; they, to Eiseley in a decade (the fiftes) when popular and oversimplified arguments about the implications of evolution and natural

selection were rampant, were complex combinations of the traits and characteristics of many past and present species. Starfish, fish, and ape had all had their place in human phylogeny. Perhaps it is better, Eiseley suggests, to couch these basic truths in dramatic form to communicate their full impact.

By moving to narrative Eiseley never leaves behind his emphases on change and adaptability. These concepts become what Wolfgang Iser would call the thematic horizon behind each line and word in his text (96). A new sense of time, time as movement into the dynamics of species interaction rather than out of one form into another lies behind Eiseley's narrative impulse.

Two needs, then, are filled by Eiseley's rhetorical and thematic motives. His audiences are able to see wholes in parts, to relate fact and overall picture. And, in this connection-making process, they arrive at new and more holistic senses of chronology, of species and environment interacting in complex ways to make us who we are. It is this more dynamic and organic understanding of motive that I believe can result from the move from modal to topical analysis of the current science essay. In the last half of this paper, I wish to make a general connection between the situations of Aristotle as he composes his Rhetoric in fifth-century B.C. Athens and the work rhetoricians of today are attempting to do with the science essay. In carrying out this synopsis of Greek oral and written rhetoric, I shall rely on the work of Havelock and Ong.

III.

Literacy in Aristotle's time was still essentially oral. Plato, in The Republic, had rebelled against the rigidity and the mesmerizing qualities

of oral formulaic poetry by proposing a new, transcendent rhetoric, premised on the dialogue. By encouraging interruptive questioning (or eristic) Plato's dialogues proposed a new form of consciousness. This new consciousness was supported by a literacy in which close attention was paid to the logical and formal connectedness of discourse and less to immersion in the cultural myths and stories of oral poetry. Aristotle, by placing his rhetoric in the handbook tradition that Socrates had so maligned in the Georgias and Phaedrus, attempted to codify the principles and conventions of oratory in a way that was easily accessible to individual writers. But he attempted to accomplish this codification without sacrificing the abstracting and philosophising qualites of the Platonic dialogues. To make this synthesis work, Aristotle had to separate what he felt were the demonstrable certainties of science (geometric proofs) and dialectic (the syllogism) from the probabilities of rhetoric. All the enthymemes of rhetoric could accomplish was persuasion to probable truths, never to conviction concerning definite truths. For over two thousand years, this split between rhetoric and dialectic, between popular and scientific or "serious" discourse has haunted Western culture.

Let me now consider the place of the topics in these two very different cultural conditions, Aristotle's and Eiseley's. Aristotle's common and special topics were fashioned to help the discourser construct probable arguments for popular audiences. The discourser intending to persuade either a legal, political, or popular assembly of the validity of an enthymeme (not a syllogism, of course, which was reserved for the more philosophical and systematic discourse of dialectic) would move to common topics of degree,

comparison, and authority or testimony to support an argument. In what was still primarily an oral culture, Aristotle needed to convince his students that oral discourse should be grounded in these then-new common topics of abstract thought. Plato and Socrates had established the situation in which abstract reasoning--Socrates' pursuits of definitions of justice, wisdom, and the ideal state, for example--could hold sway over the minds of educated citizens, even while discourse was delivered orally. Aristotle took these abstract patterns of thought, made them into common topics, and codified them in a technical or handbook rhetoric. The common topics were actually located in the minds of the evolving, literate audience, gradually replacing among the educated the formulas and mythos of Homeric poetry.

How, then, does this interpretation of the conditions existing in Aristotle's time relate to what I have said earlier about Eiseley and the narrative topic? I would assert that science essayists such as Eiseley are actually moving modern discourse in a direction opposite to what Aristotle accomplished in his time. No longer do educated discoursers need to be reminded of the common patterns of thinking as they write; rather, in a predominantly literate culture, thinking is subconsciously controlled and organized by these older topics. In fact, the common topics of Aristotle are in constant friction with the more specialized topics and ways of knowing of modern scientific and written disciplines. The modern identifying relationship between reader and writer is marked by acts of translation in which the special ways of knowing that characterize disciplines are transformed into the educated general reader's intuitive sense of the traditional common topics. But these transformations must be accomplished

without destroying or ignoring the systematic ways of knowing codified and valorized in the scientifc community.

Take, for example, the natural scientist's reliance on the typical introduction (problem definition), methods and materials (description of experimental methods), results (of this particular experiment, objectively summarized), and discussion format of the science paper. Is not the rigid adherence to what belongs where in this discourse--a particularly Ramistic convention--the hard scientist's way of assuring that the layperson does not too easily transiate scientific method into common topics and ways of knowing? Is not this systematic adherence to a format in which interpretation never arises until all summary and description of the experiment and its results are completed a way of enforcing the modern scientfic notion, following Descartes and his scepticism concerning all inherited ways of knowing, that external reality, not stored linguistic structures and axioms, should control human inquiry? The format of the science paper, then, becomes the scientist's ways of empowering nature, and also a way of assuring that the way scientific communities do their research is perpetuated.

But, of course, I am here describing ordinary, everyday science. What Eiseley, Gould, Sacks, Thomas, and their like do is decidedly not ordinary science. It is extraordinary science, and we can fully understand this point only by recognizing the complexity of the rhetorical situation within which these science essayists work. They are writing for magazines such as Science and Natural History that are mostly read by well-educated, curious non-specialists. To make the working of everyday science, in all its

complexity and detail, available to this audience, the science essayist must find a form that is capable of rendering detailed scientific inquiry and fact in interesting and significant ways. What better form than story? By making narrative, an established folkloric and oral discourse tradition, into a modern common topic, science essayists are meeting their own and their audiences' needs in two ways.

First, they are satisfying their own periodic need to break out of conventional modes of inquiry and expression in order to establish and communicate larger truths. Oliver Sacks does this whenever the conventional format of the scientific case study fails to express his sense of the complexity of his human subjects. Stephen Jay Gould does this whenever the technical language and communicative formats of his fellow paleontologists seems to fail in expressing the astounding, overall significance of evolutionary theory and recent changes in our understanding of natural selection. Loren Eiseley, as I have said earlier, moves out of the science format and language into narrative in order to attach a general kind of spiritual significance to his analyses of particular fossils and to his dialogue with other anthropologists and fossil-chasers. These writers are bringing the epistemology of specialists together with the narrative rhetoric of everyday life. For them, narrative is a topic, not a mode. Telling a good story without denying the efficacy of scientfic language and method is their aim.

What are the implications for writing teachers of this move from narrative as mode to narrative as topic? I have only a short space to pursue this question. But I can suggest where a complex line of inquiry and

pedagogical development would lie. This final set of questions might function as the basis of such an inquiry.

1. When we teach writing across the curriculum courses, should we avoid narrative and descriptive modes when teaching science, and avoid the science format when teaching humanities? Or should we contruct sequences in which these modes are turned into topics? If we do, as teachers, turn these modes into topics, when and how do we introduce these topics into the composing processes of students? Might, for example, they be introduced as essayistic impulses interrupting the ordinary progress of scientific method or science writing?
2. If we do come to treat the narrative mode as a topic, how do we relate it to the expository? When does narrative need to interrupt exposition, and how are both modes colored by the writer's aim? And when, to flip the coin, does exposition need to interrupt narrative? A writer, for example, whose report on a scientific investigation into a complex phenomena is interrupted by a narrative impulse may be fusing conceptions of specialist and non-specialist audiences. Is that what we want in beginning college writing courses? Or is that best reserved for later in the curriculum? Do we, in other words, wish our students to feel the need to express larger truths in the midst of observing detail while pursuing a scientific experiment, or while tracking data in order to write a report?
3. What do we want our writing across the curriculum students to be able to <u>do</u> when they finish our and other teachers' courses? Should they have some control over scientific method and the formats that

scientists use to express the results gleaned from that method? Should they also be encouraged to step out of that professional role (the ordinary scientist) into one that will express larger, cross-disciplinary truths? In other words, are our writing across the curriculum courses part of our students' general education as well as their introductions to basic communication skills in various disciplines?

We know, I think, how Loren Eiseley would have answered this question. It remains to be seen whether or not we, as constructors of writing sequences, can put our students, even on these more basic levels, in the places of writers such as Eiseley, Thomas, Gould, and Sacks, all of whom use the narrative impulse to know and express their science in a fuller, more complete, and more human way. To be literate in such a dialogic context means to know and write in two ways at once, as scientists following a careful methodology, and as storytellers making what we learn understandable and significant to others.

Notes

[1] Berlin, in his essay on John Genung, and Connors, in his essay on the modes of discourse, both argue that an oversimplified and mechanical notion of Alexander Bain's modes came to dominate late nineteenth and early twentieth-century American composition teaching. Kinneavy argues for replacing modes, which are descriptive of written products, with an emphasis on the more organic and rhetorically-situated notion of aims of discourse. Britton and his colleagues used their research into British secondary school writing courses to argue that the function rather than the form of an assignment was far more important to the learning of students.

[2] Collections of essays by all these writers appear in the Works Cited section.

[3] Debra Journet of Pennsylvania State University has delivered several excellent papers on Oliver Sacks an science essayists in general at recent MLA and CCC conferences. I have articles forthcoming in the Journal of Advanced Composition and Freshman English News on similar topics. Donald McQuade chaired a panel at the 1987 CCCC in Atlanta on science essayists. I have given papers at MLA in 1987 (San Francisco) and at several CCCC meetings on science essayists and theories of literacy. Much of this work should be soon available in journals and books.

[4] Eiseley's narrative impulse was first clearly established when he published The Immense Journey in 1956. His choice of the novelistic journey motif to organize his observations and reflections placed him

firmly into a central narrative tradition.

[5] Eiseley devotes a good deal of space to these current controversies in The Immense Journey, published in 1956.

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